

Clean version of the amended independent claim 9 follows:

9. An enhanced volume phase grating comprising:

a rigid support means;

a volume phase medium attached to said rigid support means;

a transparent cover means attached to said volume phase medium with a transparent adhesive to provide a sealant and protectant for said volume phase medium;

the bulk refractive index, n , of said volume phase medium being periodically modulated within the thickness, T , of said volume phase medium in a direction parallel to the surface of said volume phase medium, with a peak value of refractive index equal to $n + \Delta n$, where Δn is the peak modulation of said bulk refractive index, n , the periodic sequence of said peak values of said refractive index throughout said thickness, T , of said volume phase medium creating a periodic structure of Bragg surfaces within said volume phase medium with a period, d , where

said period, d , is established by selecting any two positive integers s and p , such that $s > p$, and any arbitrary internal angle of incidence, α , calculating the internal angle of diffraction, β , with the following equation:

$$\beta = \text{either } a \cos\left(\frac{2p-1}{2s-1}\right) - \alpha \text{ or } 180 - a \cos\left(\frac{2p-1}{2s-1}\right) - \alpha$$

and using the following equation:

$$d = \frac{\lambda}{n(\sin \alpha + \sin \beta)},$$

where λ is the nominal free-space wavelength for which said enhanced volume phase grating is designed,

and said peak modulation, Δn , of said bulk refractive index is obtained from the following equation:

$$\Delta n = \frac{\lambda}{T} \left(\frac{2s-1}{2} \right) \sqrt{(\cos \alpha) \left(\cos \alpha - \frac{\lambda}{nd} \tan\left(\frac{\beta - \alpha}{2}\right) \right)},$$